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GEOPHYSICAL SURVEY REPORT
REF NO. 2
(KOLA TREE-ALLEN TOWN)

SUBMITTED TO:
CONCERN WORLDWIDE-SL

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NTRODUCTION

ther to improve the water supply for Kola tree and it's environ, Concern Worldwide-SL contracted AL Drilling Company, to explore the possibility of getting ground water in this area. As part of our rations, we therefore carry out a Hydrogeological and Geophysical investigations in sitting the borehole tion in the project area.

se studies among others provided enough data and information used in assessing the possibility of ing groundwater in the project area. This report documents the work carried out during the stigations at the site.

BACKGROUND / GEOLOGY OF PROJECT AREA

project area lies within the Freetown Basic Complex. The Freetown Complex is formed mainly by ltic magmatism and outcrops can be found in the west as a result of younger igneous intrusions and ion. The Freetown Complex is a layered gabbroic anorthosite intrusion, emplaced gneisses and schist of Kasila group. It forms part of the Peninsula and Banana Island. It is thought to have been formed due to tiple injections of magma that occurred intermittently. However most of these formations are obscured overlain by hard compacted laterites and some sedimentary materials.

refore, groundwater potential of the Freetown Basic Complex is found within fractured zones of these ous (crystalline) rocks. However, groundwater quality and quantity could be high if properly located ugh the appropriate hydrogeological and geophysical investigations.

FIELD WORK

field work was divided into two phases;

- Reconnaissance Survey; and
- Geophysical Survey.

Reconnaissance Survey

aim of the reconnaissance survey was to select suitable area (s) for geophysical survey, considering the logical/Hydrogeological, environmental and other physical conditions.
reconnaissance survey included the following:

1 Geomorphological Survey of the Area

describes the landscape and other physical features on the project area. The project area is on a slope an elevation of about 119m above sea level. There were no in-situ outcrops in the immediate oundings. Out crops can only be seen from a distance.

2 Geological survey to determine the formation of the area and to identify possible rogeological features

project area is overlain by hard compacted laterites which was a result of weathered bedrock. Plants in the area are fresh/green indicating that they are getting direct water intake at a shallow depth.

Geophysical Survey

Geophysical survey consisted mainly of Electrical Resistivity i.e. Vertical Electrical Sounding (VES) g ABEM SAS 1000 Terrameter Resistivity meter.
edures carried out include;

1 Selection of Traverse Line

traverse line was selected on the basis of geomorphologic and physical features as well as rogeological features of the area. There was no visible strike direction of the geologic formation of the due to weathering and surface erosion. Selected point for the Vertical Electrical Sounding (VES) was ked with a peg for identification.

2 Selection of VES points

Vertical Electrical Sounding (VES) point was selected based on the site location and geological res.

3 Vertical Electrical Sounding (VES)

ical Electrical Sounding (VES) was carried out with the aim of determining the formation resistivities he depth to bedrock, as well as finding the possibility of obtaining fractures at depth.
Schlumberger electrode configuration and the required procedures were used for the VES.

4. DATA ANALYSIS AND INTERPRETATION

The Vertical Electrical Sounding (VES) data and the corresponding curve are presented below:

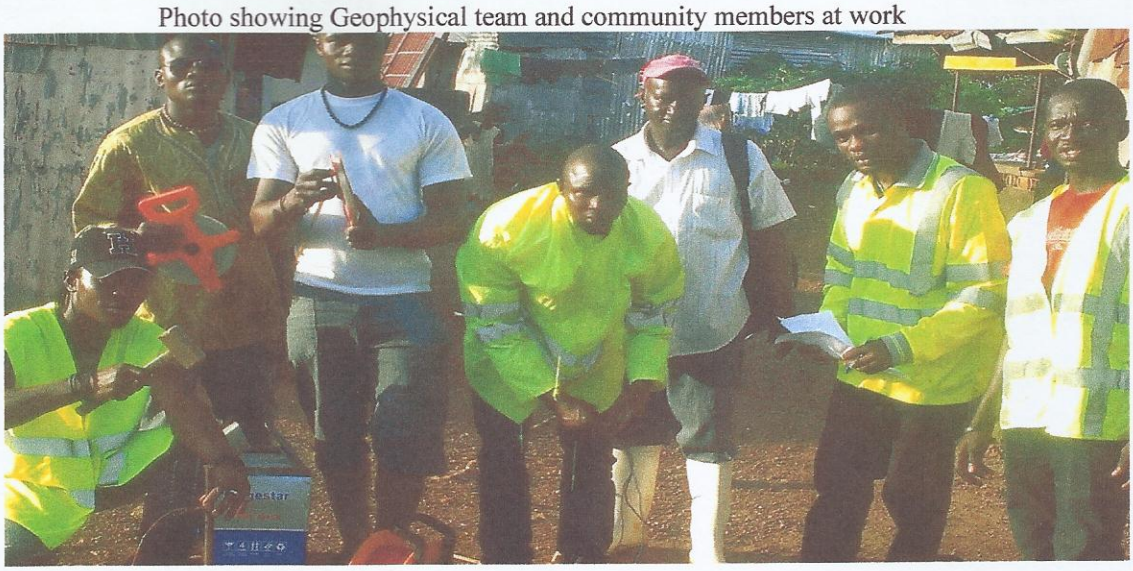
Table 1: Schlumberger Array VES Data (30 A Main Road, Kolla Tree)

Client: **Concern Worldwide-SL**	Community: **Kola Tree-Allen Town**
Project: **Geophysical Survey**	Sounding Number: **1**
District: **Western Area**	GPS Coordinate East: **0702601**
Date: 11th September,2015	GPS Coordinate North: **0931720**
Field Operator: Kemoh Alie Bayoh	Elevation: **119m**

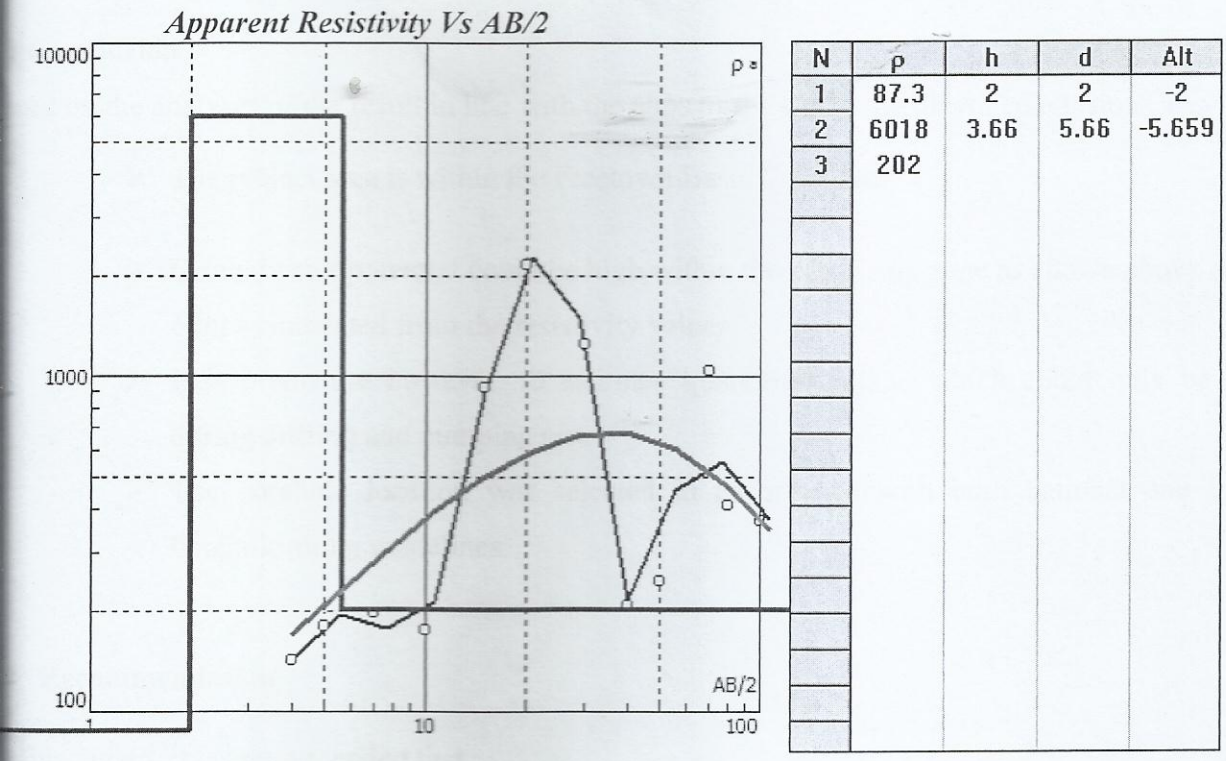
Schlumberger Array VES Field Data

No.	AB/2	MN	Resistance (ohm)	Apparent Resistivity (ohm-m)
1	4	0.8	2.2952	142.79
2	5	0.8	1.8345	178.97
3	7	0.8	1.0232	196.27
4	10	1.5	0.8393	174.82
5	15	1.5	2.4300	924.79
6	20	1.5	2.5611	2142
7	30	1.5	0.6613	1245.98
8	40	7.6	0.3179	208.384
9	50	7.6	0.2385	245.08
10	70	7.6	0.5141	1038.38
11	80	14	0.2907	414.35
12	100	14	0.1666	372.07

Photo showing Geophysical team and community members at work



Model 1: Schlumberger Array VES Curve and Model



N	ρ	h	d	Alt
1	87.3	2	2	-2
2	6018	3.66	5.66	-5.659
3	202			

Table 2: Selection of Promising Points from VES Data

No.	LAYER	THICKNESS (m)	DEPTH (m)	APPARENT RESISTIVITY (Ohm-m)	POSSIBLE WATER ZONES (M)	RANKING	MAX DRILLING DEPTH (M)
1	1 2 3	2 3.66 -	2 5.66 -	87.3 6018 202	20-60	Medium	100

eduction from data suggest possible zone of groundwater at 30-60m, but drilling can reach 80m or ore inorder to obtain a productive yield.

CONCLUSION AND RECOMMENDATIONS

1 Conclusion

ased on the analyses of the result in line with the aims of the study, the drawn conclusions are;

- The project area is within the Freetown Basic Complex.
- Groundwater potential could be high within the promising zone as shown above at depth 30 - 60m as indicated from the resistivity values.
- It is premature however, to estimate quantities/volume which could only be determined during drilling and pumping test.
- The borehole location was selected in accordance with both national and international borehole siting guidelines.

2 Recommendation

this regard, it is recommended that,

- Drilling could be carried out at the selected point to confirm the existence of groundwater.
- The maximum drilling depth should be 100m to cut across the first promising zone of 30-60m to ensure reliable productivity. However, the supervisor may exceed this depth based on the field conditions.
- Both physico- chemical and bacteriological tests should be carried out on the borehole water samples from the completed well.
- Borehole must be constructed using the correct and standard materials such as standard uPVC screens and plain casings, well sorted gravels etc. for water quality and high yield.

EPORT SUBMITTED BY:

8/10/15

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ologist / Field Operator

moh Alie Bayoh

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